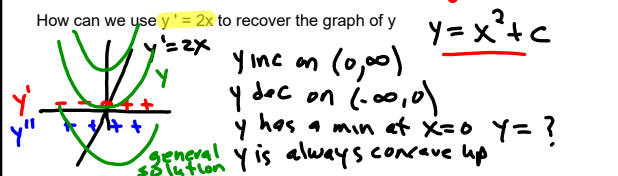


## 6.1 Differential Equations and Slope Fields

How can we use  $y' = 2x$  to recover the graph of  $y$ Find all solutions to the differential equation  $\frac{dy}{dx} = \sec^2 x + 2x + 5$ 

$$y = \tan x + x^2 + 5x + C$$

Find the **specific solution** that satisfies the initial conditions  $x=0, y=7$ 

$$7 = \tan 0 + 0^2 + 5 \cdot 0 + C$$

$$y = \tan x + x^2 + 5x + 7$$

$$7 = 0 + 0 + 0 + C$$

$$7 = C$$

Find the general and specific solutions to

$$\frac{dy}{dx} = e^x - 6x^2 \quad \text{initial conditions: } (1,0)$$

$$y = e^x - 2x^3 + C$$

$$0 = e - 2 + C$$

$$2 - e = C$$

$$y = e^x - 2x^3 + 2 - e$$

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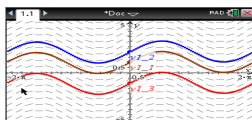
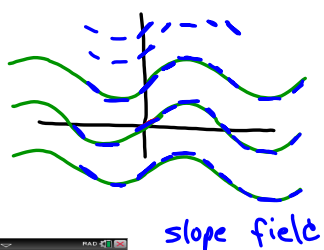
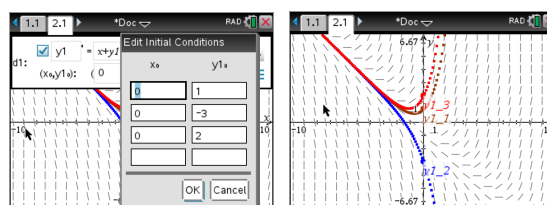
Solve  $y' = \cos(x)$  algebraically and graphically

$$y = \sin x + C$$

$$\cos 0 = 1$$

$$\cos \frac{\pi}{2} = 0$$

$$\cos \pi = -1$$

Solve  $y' = x + y$  graphically

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Nov 29-9:58 AM